

GRINDING (ABRASIVE WHEEL MACHINERY)

HAZARDS & RULES

Base Materials - Hazards and Impacts

Grinding is performed by using an abrasive wheel, made up of individual particles that are bonded together to form a wheel. The hazard with abrasive wheels is that, if not properly mounted and used, the wheel can explode, sending sections of the wheel flying out at high speeds. The pieces of the wheel can strike the machine operator, causing death or serious injury.

Another hazard associated with abrasive wheel machinery is the rotating motion of the spindle end, nut, and flange projections. To avoid injury as a result of contact with these mechanical parts, the side of the wheel must be covered to enclose these parts (some exceptions are allowed and are listed in the "You Must" section that follows.)

Regulatory Overview

OSHA

To protect the machine operator as well as other employees who are in the area, machine safeguarding is required. A good rule to remember is: Any machine part, function, or process which may cause injury must be safeguarded. Machine safeguarding may be done by using controls or by eliminating the hazard (i.e., the use of the equipment.)

Three basic areas of machines require safeguarding:

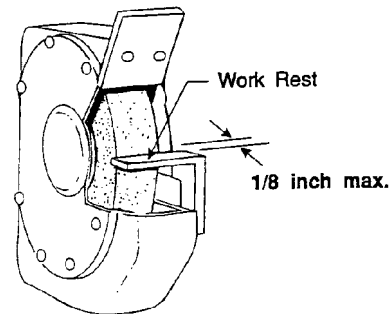
- 1) *The point of operation:* the point where work is performed on the material, such as grinding, gutting, or boring.
- 2) *Power transmission apparatus:* all components of the mechanical system which transmit energy to the part of the machine performing the work. These components include flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, and gears.
- 3) *Other moving parts:* all parts of the machine which move while the machine is working. These can include reciprocating, rotating, and transverse moving parts, as well as feed mechanisms and auxiliary parts of the machine.

MANAGEMENT RESPONSIBILITIES

Listed below are the practices that you must follow in order to limit potential hazards associated with the use of grinding wheels. Also listed are suggested practices that you should follow in order to provide additional measures of safety.

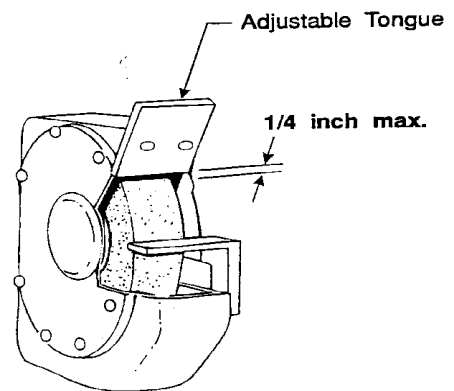
You Must:

- ! use goggles or a face shield when using a grinder.
- ! ensure that your grinder meets the following requirements:
 - is grounded.
 - has its own on/off switches.
- ! ensure that abrasive wheels are only used on machines that have safety guards, with the following exceptions:
 - wheels used for internal work while within the work being ground;
 - mounted wheels, used in portable operations, 2 inches and smaller in diameter; and
 - type 16, 17, 18, 18R, and 19 cones, plugs, and threaded hole pot balls where the work offers protection from the debris of the spinning part in the event that this part should break. (If you are unsure as to which type of equipment you have, check the information on the equipment or the purchase records.)
- ! ensure that abrasive wheel safety guards cover the spindle end, nut, and flange projections (i.e., ensure that the machine has side guards), except when:
 - the object being ground provides a suitable measure of protection to the operator in the event that the wheel should break;
 - the work entirely covers the side of the wheel; and
 - machines are designed as portable saws.
- ! for offhand grinding machines (i.e., machines that require that the operator stand directly in front of them), adjustable work rests made of rigid construction must be used to support the work. The work rests must be kept adjusted closely to the wheel with a maximum opening of 1/8 inch to prevent the work from being jammed between the wheel and the rest, which could cause the wheel to break. Because your grinding wheel will likely decrease in size each time that you use it, it may be necessary to adjust the work rest **after** each use to ensure that the distance does not exceed 1/8 inch.



- ! ensure that the safety guards for bench and floor stands, and for cylindrical grinders do not expose the grinding wheel periphery for more than 65 degrees above the horizontal plane of the wheel spindle. For example, if you have a six-inch grinding wheel, only a 5.1 inch section of the outside edge of the wheel may be exposed. The remaining portion of the wheel must be enclosed by a safety guard. The exposed portion of the wheel must be above the horizontal plane, or top half of the wheel.

- ! ensure that the protecting member of the abrasive wheel safety guard (tongue guard) is adjusted so that the distance between the wheel and the adjustable tongue does not exceed 1/4 inch. Because your grinding wheel will likely decrease in size each time that you use it, it may be necessary to check and/or adjust the tongue guard **after** each use to ensure that the distance does not exceed 1/4 inch.



- ! immediately before mounting, you must closely inspect and sound (using the ring test) all grinding wheels to ensure they have not been damaged. To perform the ring test, hold the wheel through its center, using your finger or a screwdriver or similar object to support the wheel. Gently tap the wheel on each of its four quadrants with a light non-metal object such as a plastic or wooden screwdriver handle. The wheel should ring. If the wheel does not ring, don't use it.
- ! before mounting a new wheel, check the spindle speed of the machine to ensure that it does not exceed the maximum operating speed marked on the wheel. Your grinder should have its maximum spindle speed marked on it.
- ! because pedestal grinders are generally top heavy, they must be secured. As a general rule, if your machine has holes in its base, anchor it. Note that you may secure your grinder to either the floor or to a large dimension base plate.

You Should:

- ! buy machinery that is intended for industrial use, as this class of machinery includes the necessary safety mechanisms for occupational use. Products intended for home use do not include all of the safety mechanisms, and, therefore, require that you determine the necessary safety mechanisms and properly add these mechanisms to your machinery.

